3-21-2019

Webinar: E-Bikes for Everyone: Electrifying Communities in New Ways

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Go Forth Electric Showcase

E-Bikes for Everyone: Electrifying Communities in New Ways

TREC / Forth Webinar March 21, 2019

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TREC
TRANSPORTATION RESEARCH and EDUCATION CENTER

Portland State
UNIVERSITY

Will e-bikes…

- Get more people to bike, and

- Get people to bike more often.

WHY DO E-BIKES MATTER?

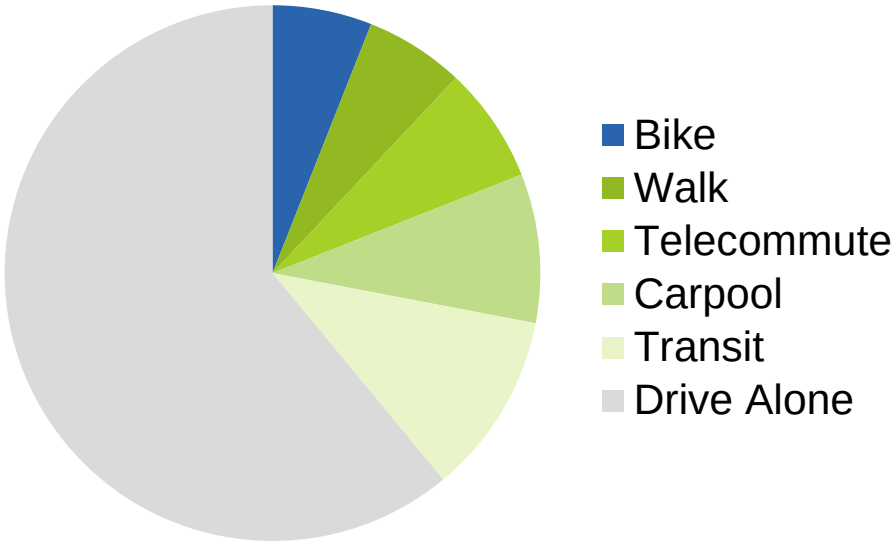
Portland State UNIVERSITY

TREC
Transportation Insight for Vibrant Communities

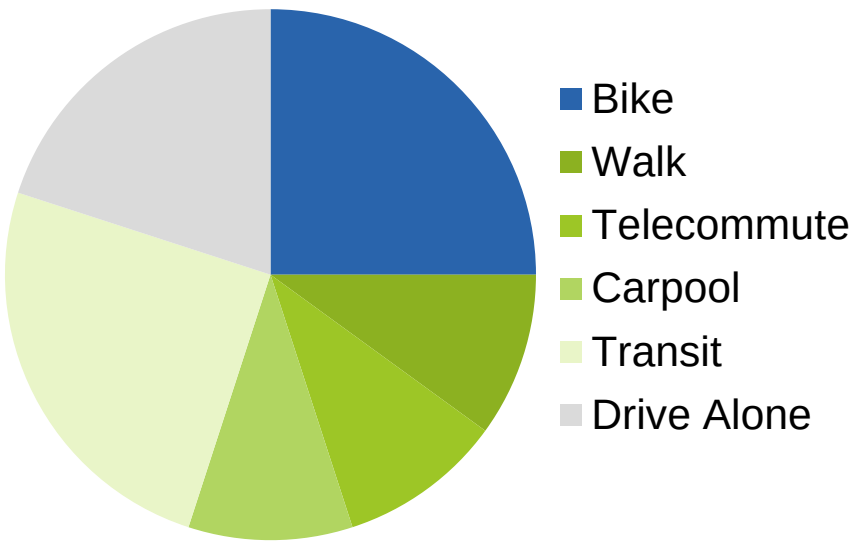
Commute Mode Share for Portland

Reduce per capita daily vehicle-miles traveled (VMT) by 30 % from 2008 levels.

2012



2030

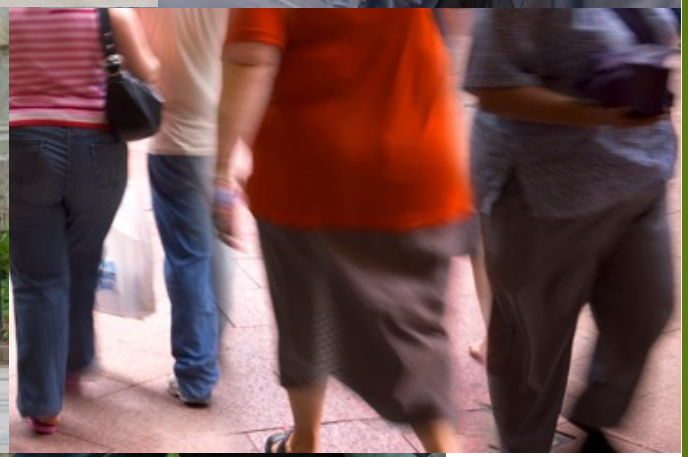


Portland Climate Action Plan, 2015

People who live in areas that are hilly

People who commute distances greater than 5 miles

Cycling can be more difficult as people grow older



People that have a physical limitation that makes cycling difficult

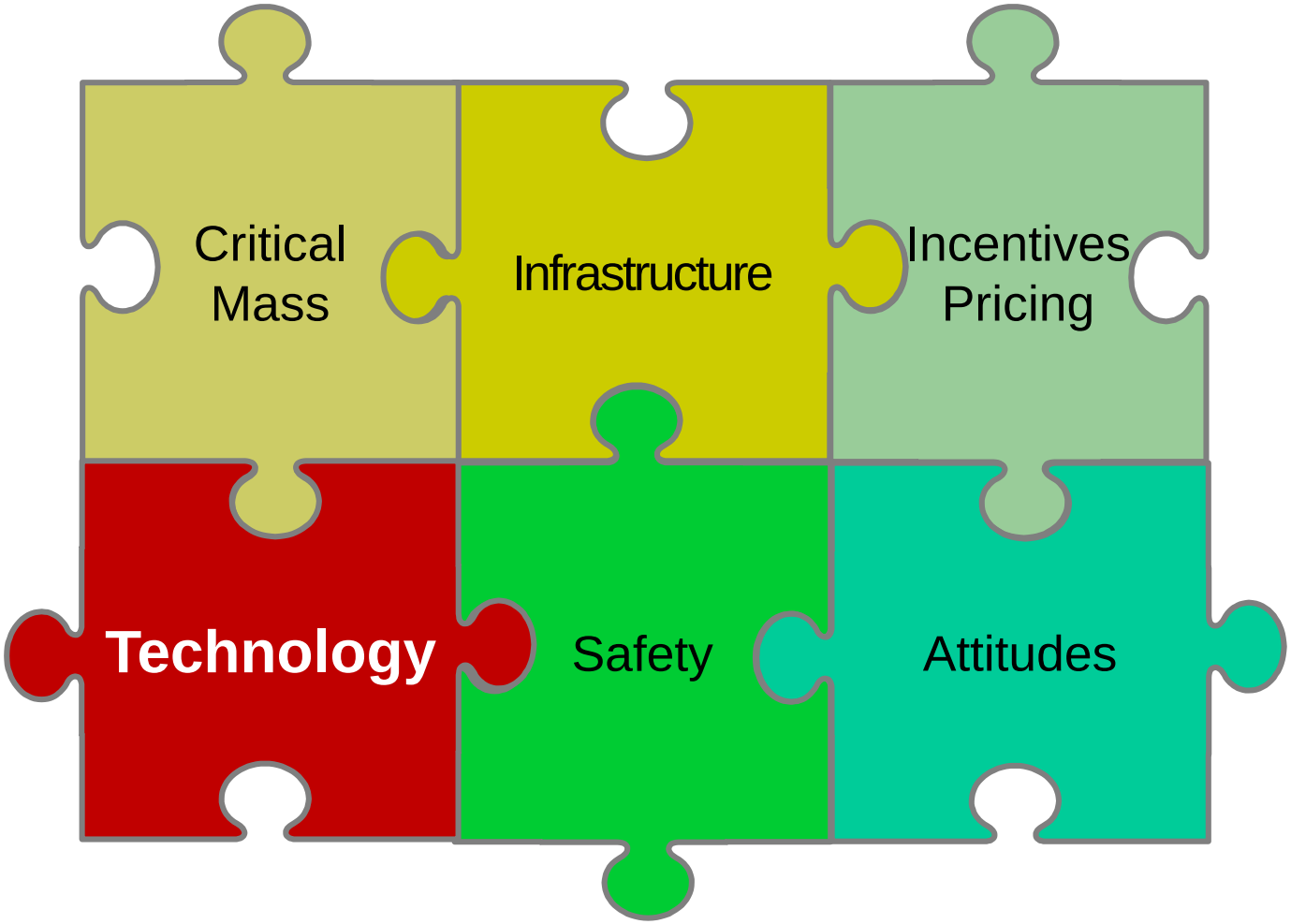
Woman tend bike less that men. Women make 25% of all bike trips in the US.

People don’t always feel safe biking in traffic

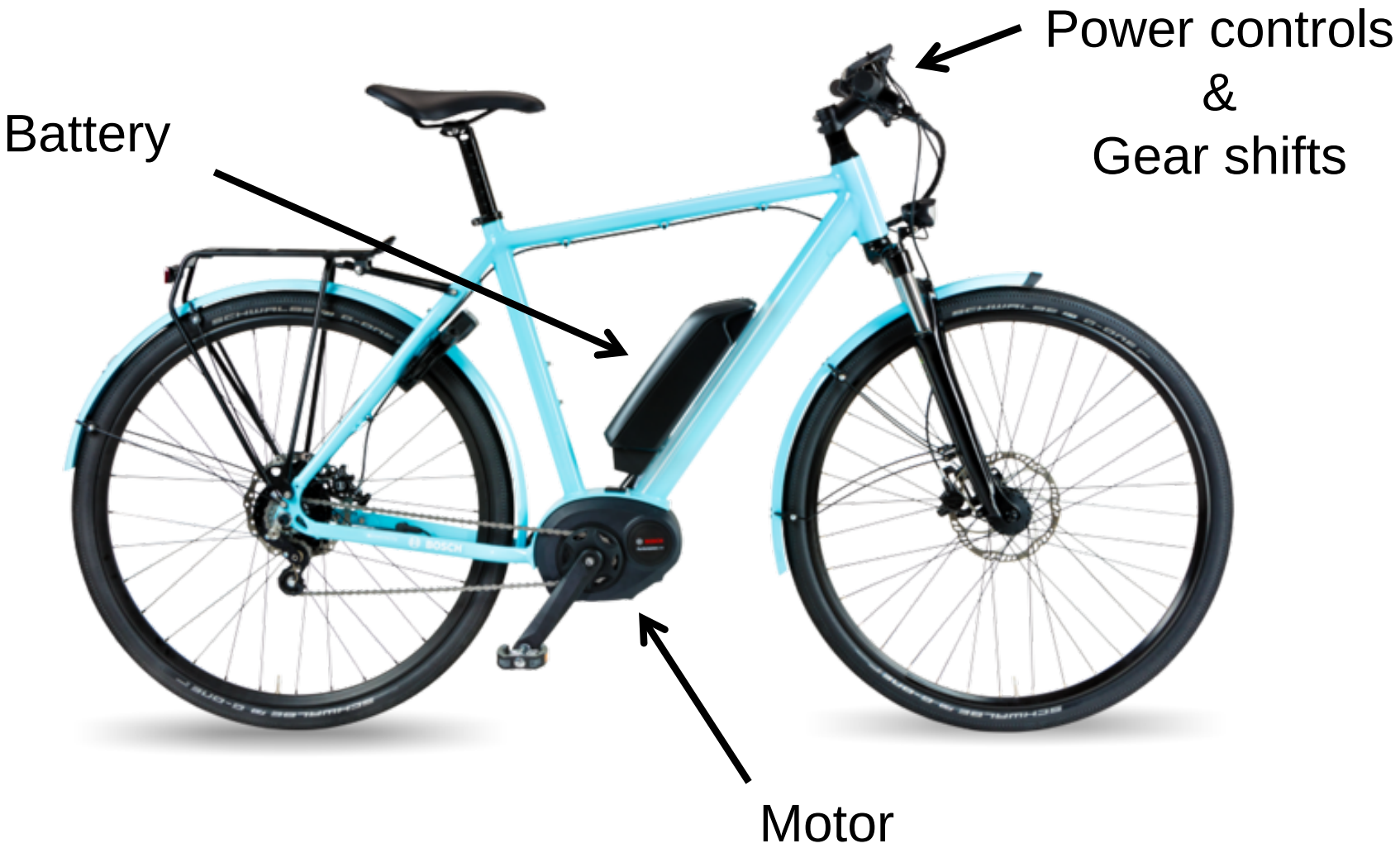
People who don’t want to sweat or wear special clothes to commute

People who need to carry or haul items or people

What are the critical pieces to increase cycling?



What is an electric bike?



Three Class E-Bike Model Legislation

A bicycle with two or three wheels and an electric motor with fewer than 750 watts of power.

- **CLASS 1:** Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches **20mph**.
- **CLASS 2:** Bicycle equipped with a throttle-actuated motor, that ceases to provide assistance when the e-bike reaches **20mph**.
- **CLASS 3:** Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches **28mph**.

peopleforbikes.org™

bpsa

E-Bike Resources

- Peopleforbikes.org/e-bikes

E-BIKE USER SURVEY

National E-bike User Survey

- Adapted from 2013 survey
- The survey was distributed through industry distribution channels, e-bike blogs & forums, Facebook pages, Twitter accounts, & retailers.
- May – June 2017
- 1,790 e-bike U.S. owners responded to the survey

THE UNIVERSITY OF TENNESSEE KNOXVILLE

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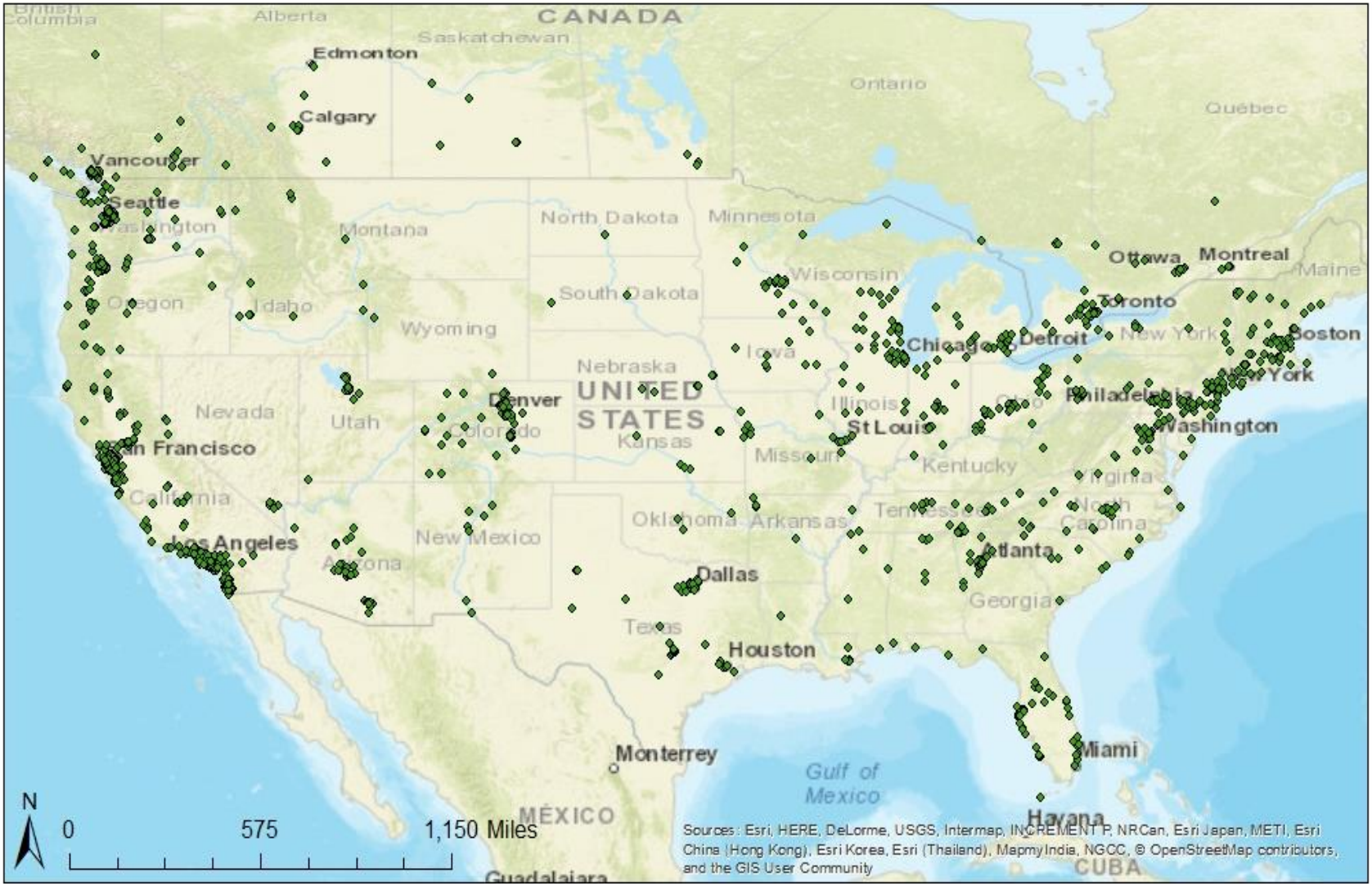
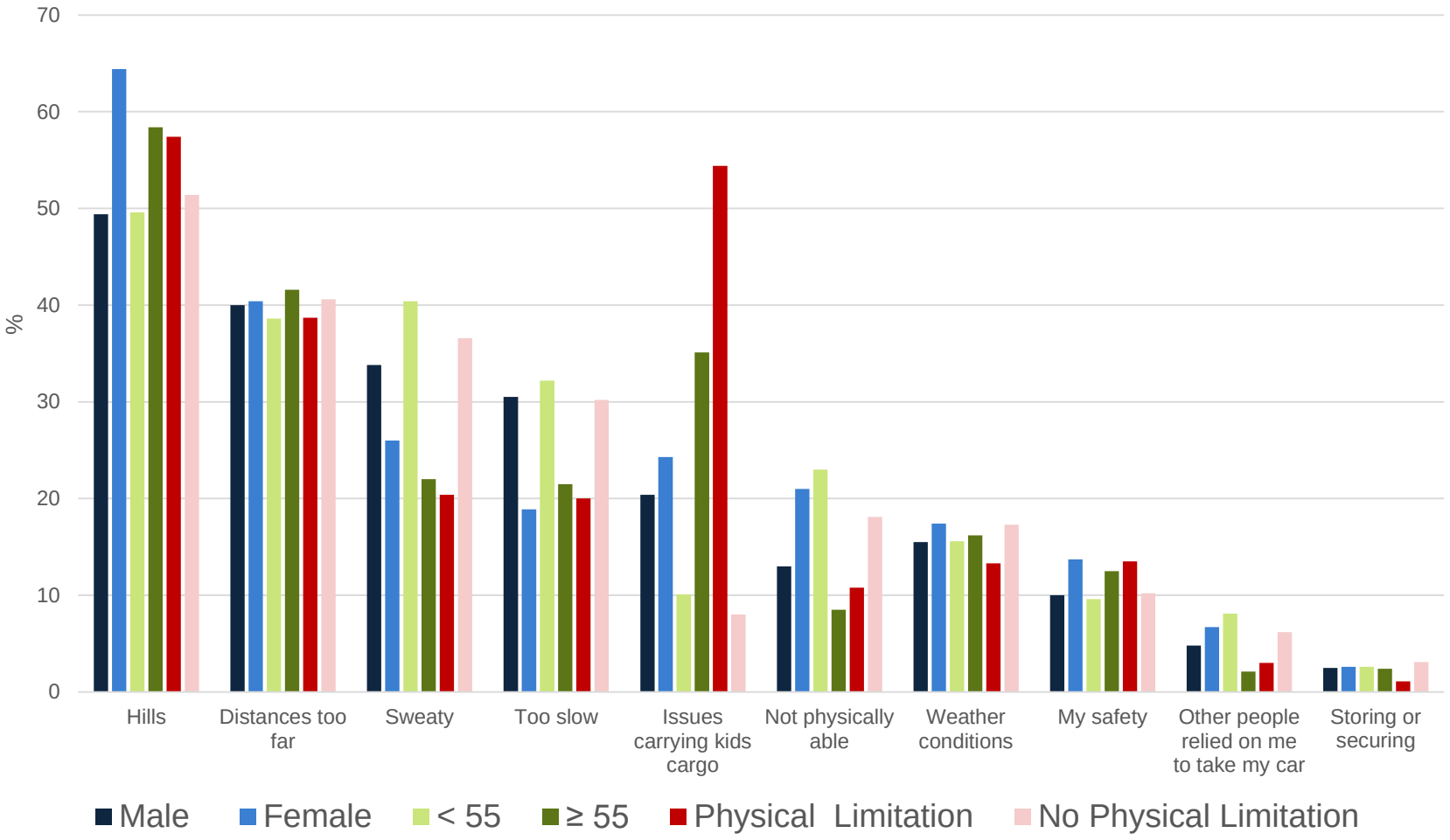
Map of Survey Respondents (excluding Alaska and Hawaii)



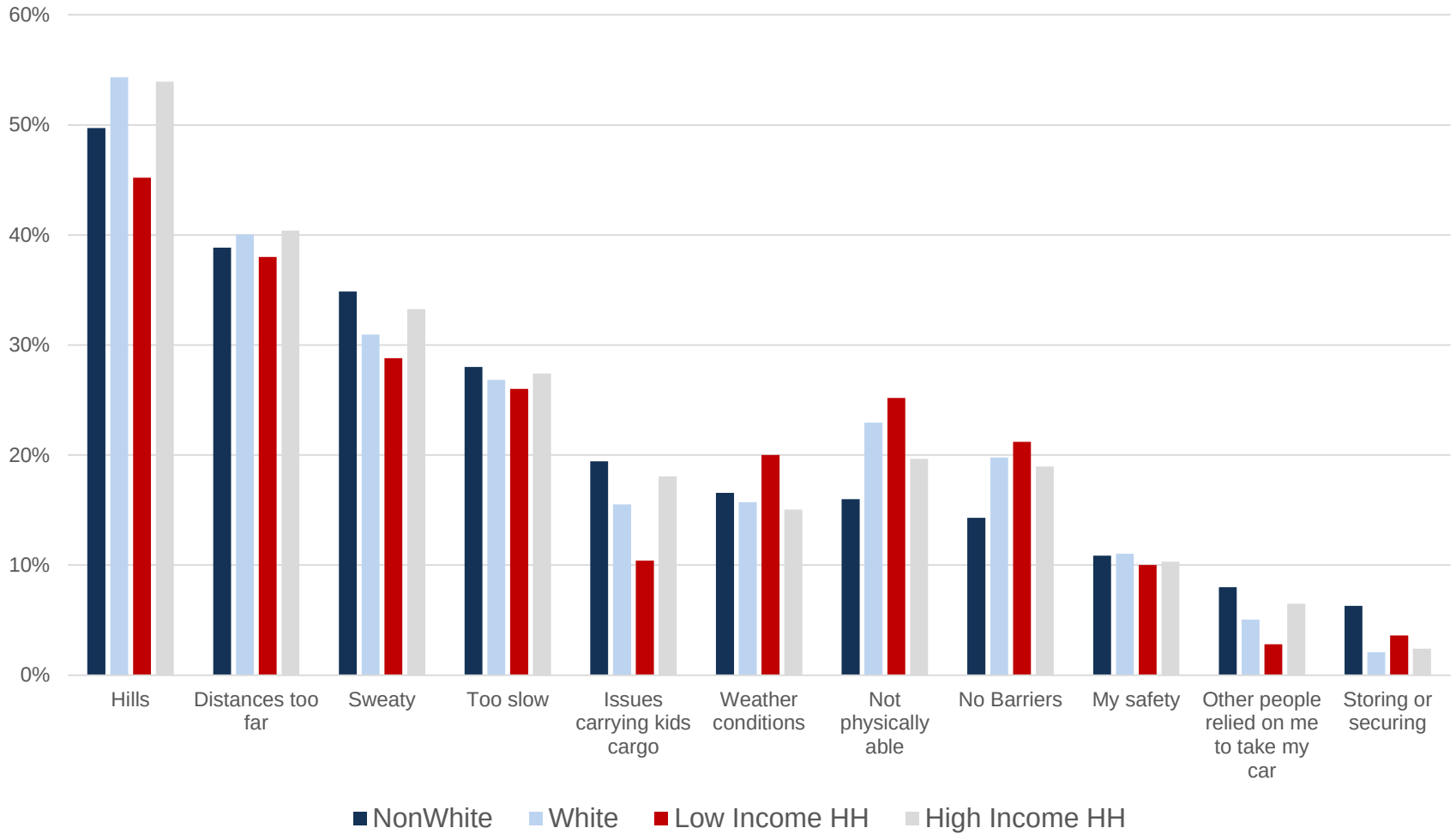
Respondent Characteristics

Gender (n=1,616)	Value (%)	Education (n=1,626)	Value (%)
Male	70.5	High school or less	5.1
Female	28.5	Some college	21.8
Other	0.2	Associates degree	7.6
I prefer not to answer	0.7	Bachelor's degree	30.3
Age (years) (n=1,598)		Graduate degree	33.9
18 to 24	2.3	I prefer not to answer	1.3
25 to 34	10.6	**Health (n=1,622)**	
35 to 44	19.9	Poor	2.0
45 to 54	20.1	Fair	10.4
55 to 64	27.9	Good	34.0
65 or older	19.2	Very good	37.4
Ethnicity (n=1,623)		Excellent	15.7
American Indian or Alaska Native	0.7	I prefer not to answer	0.6
Asian	4.1	**Do you have any physical limitations that make riding a standard bicycle difficult for you? (n=1,623)**	
Black or African American	1.3		
White or Caucasian	85.4		
Hispanic or Latino/a	2.3	Yes	28.7
Other	2.4	No	69.7
Prefer not to say	3.8	I prefer not to answer	1.7

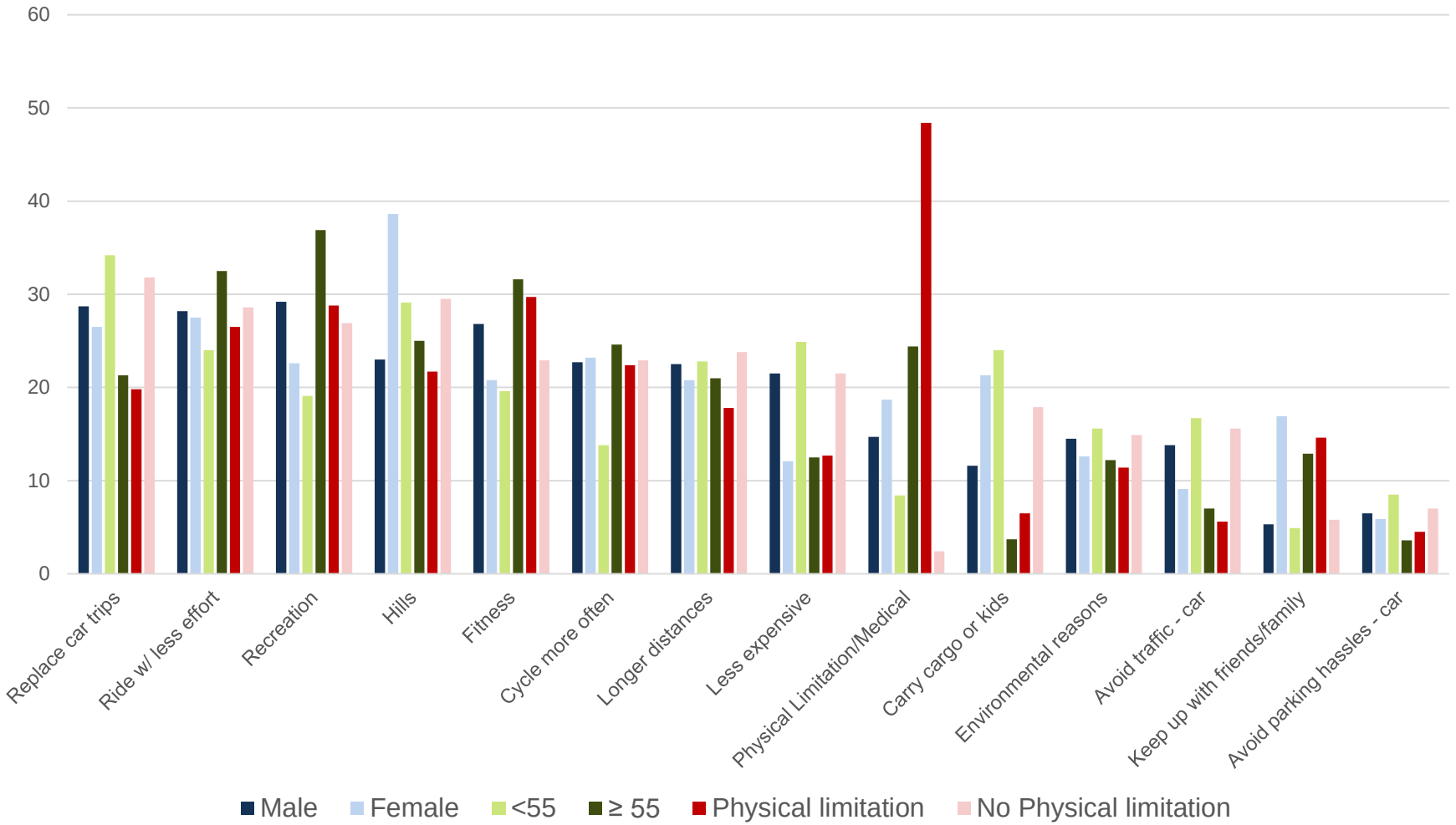
Barriers that Limited Cycling Before Purchasing an E-bike (Gender, Age, Physical Limitation)



Barriers that Limited Cycling Before Purchasing an E-bike (Race and Household Income)



Motivations for Purchasing an E-bike (Gender, Age and Physical Limitation)



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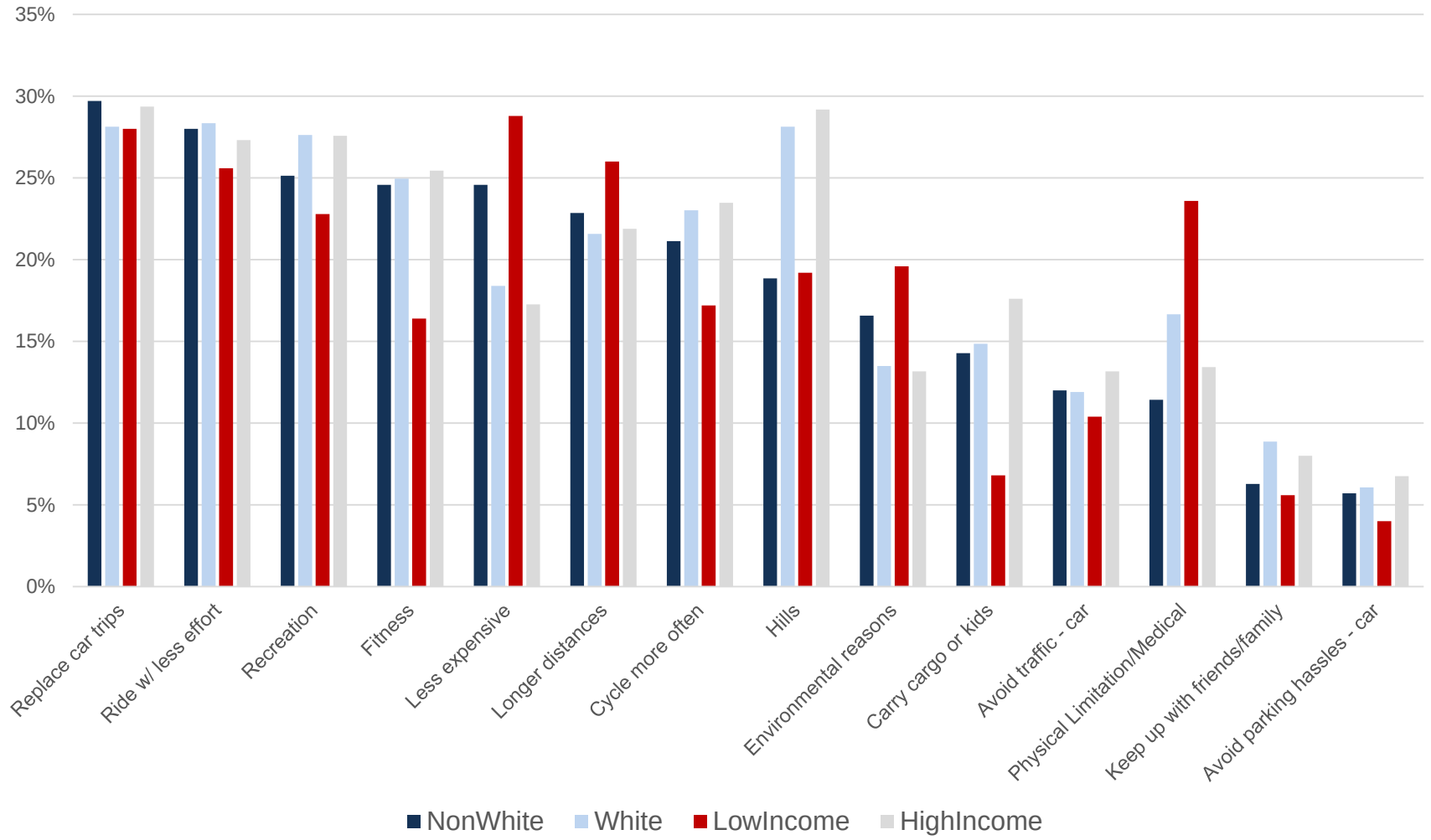
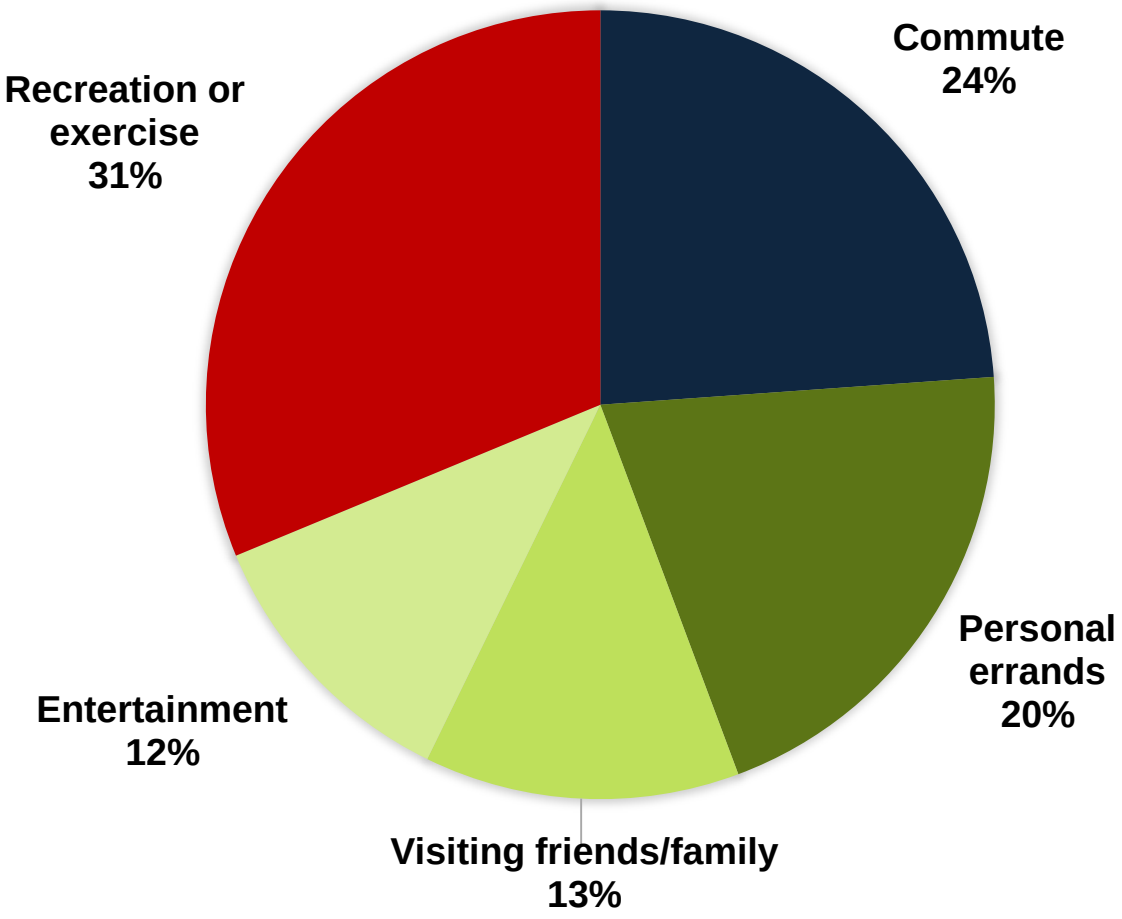
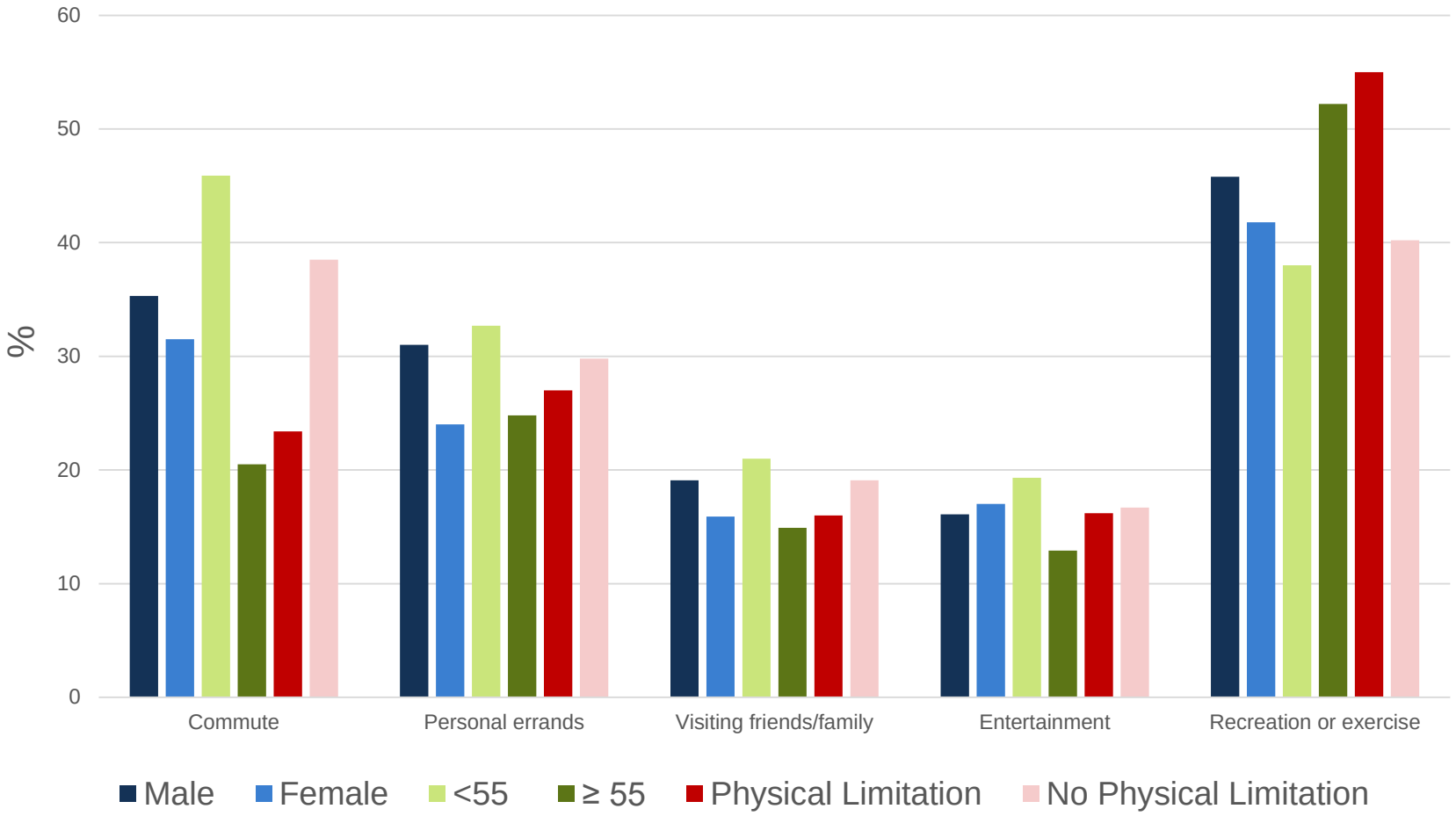


What is the *main* reason that you use your electric bike (purpose of trips)?



E-bike Used as Primary Mode by Respondent Characteristics



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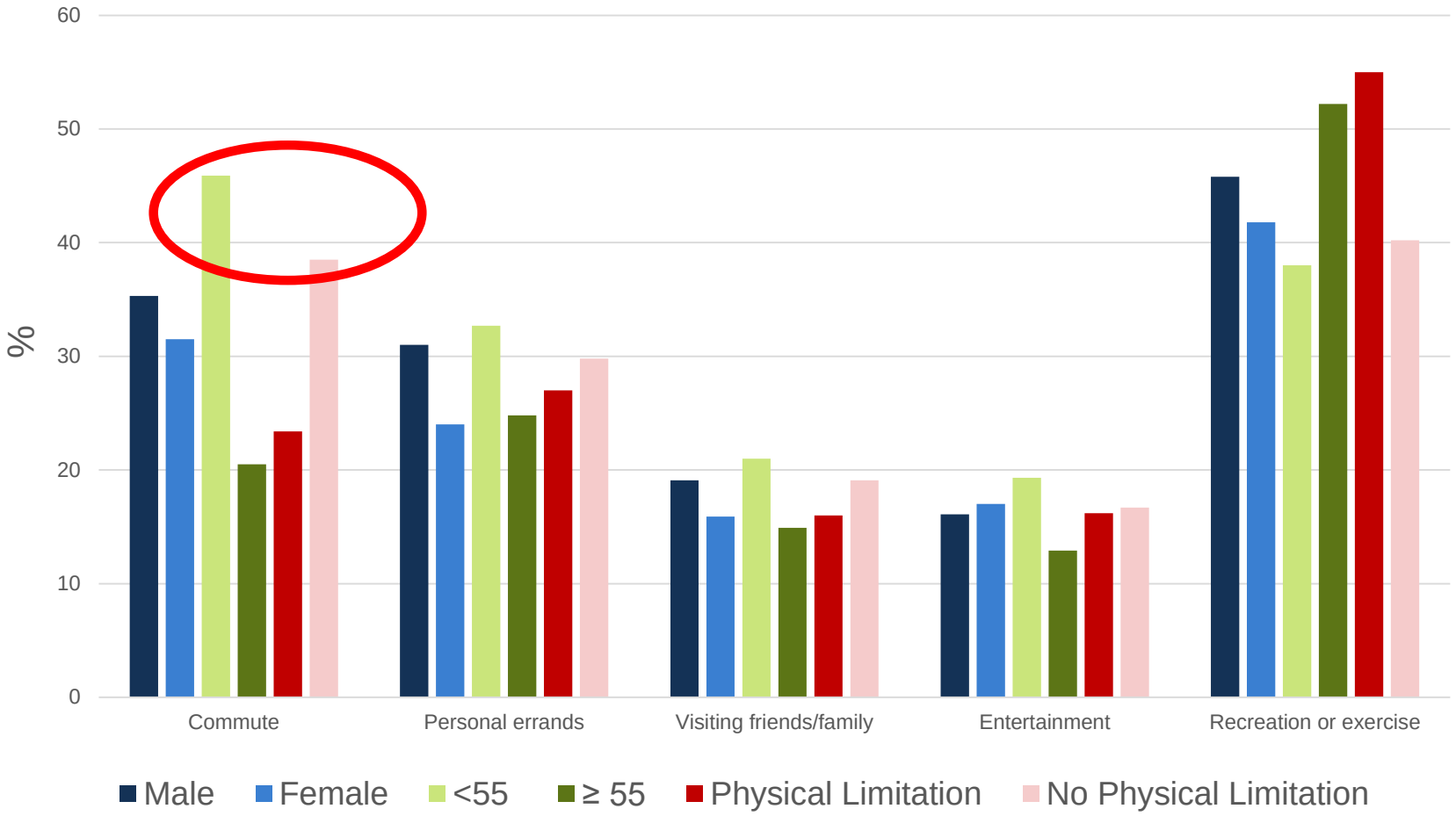

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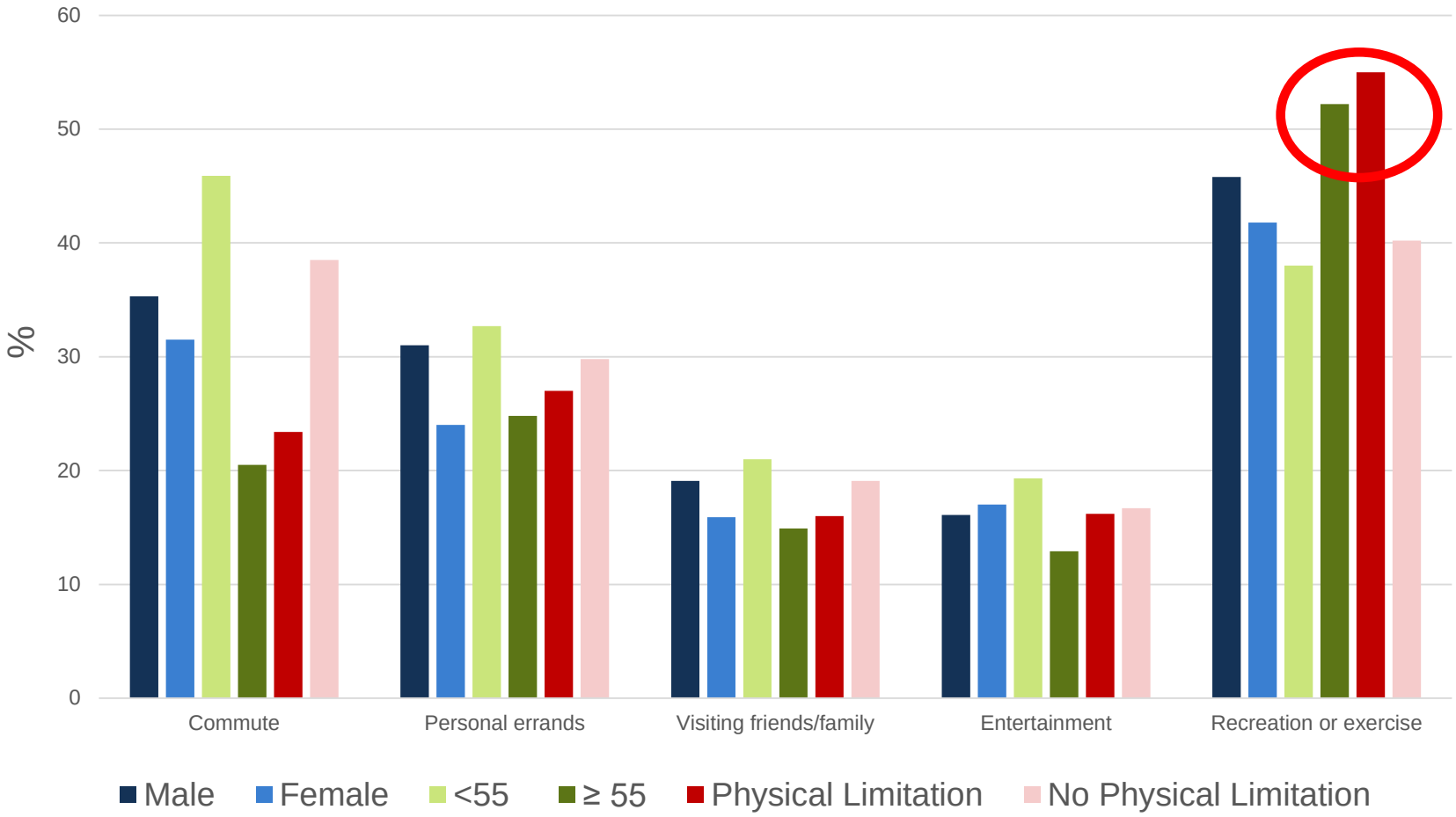
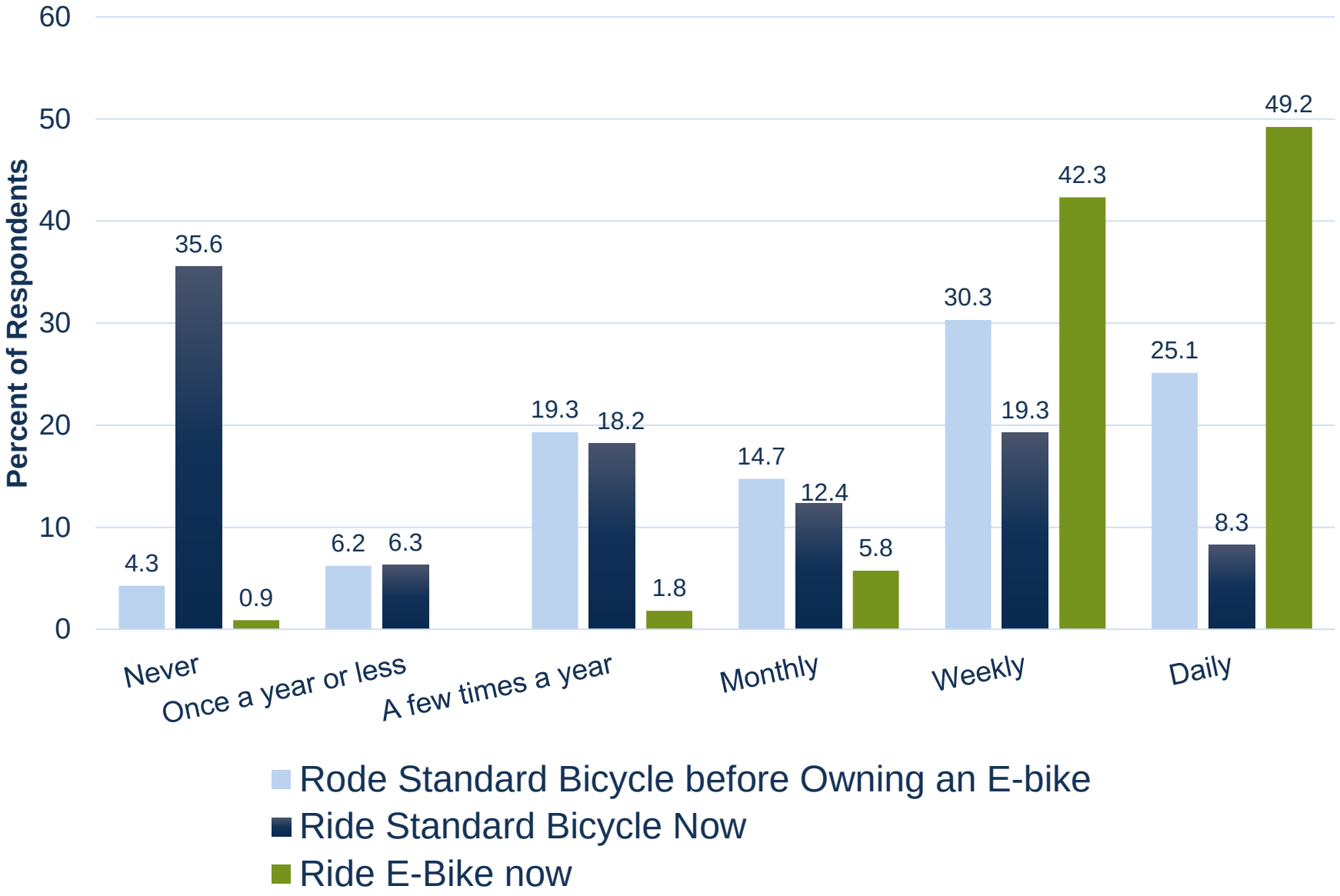
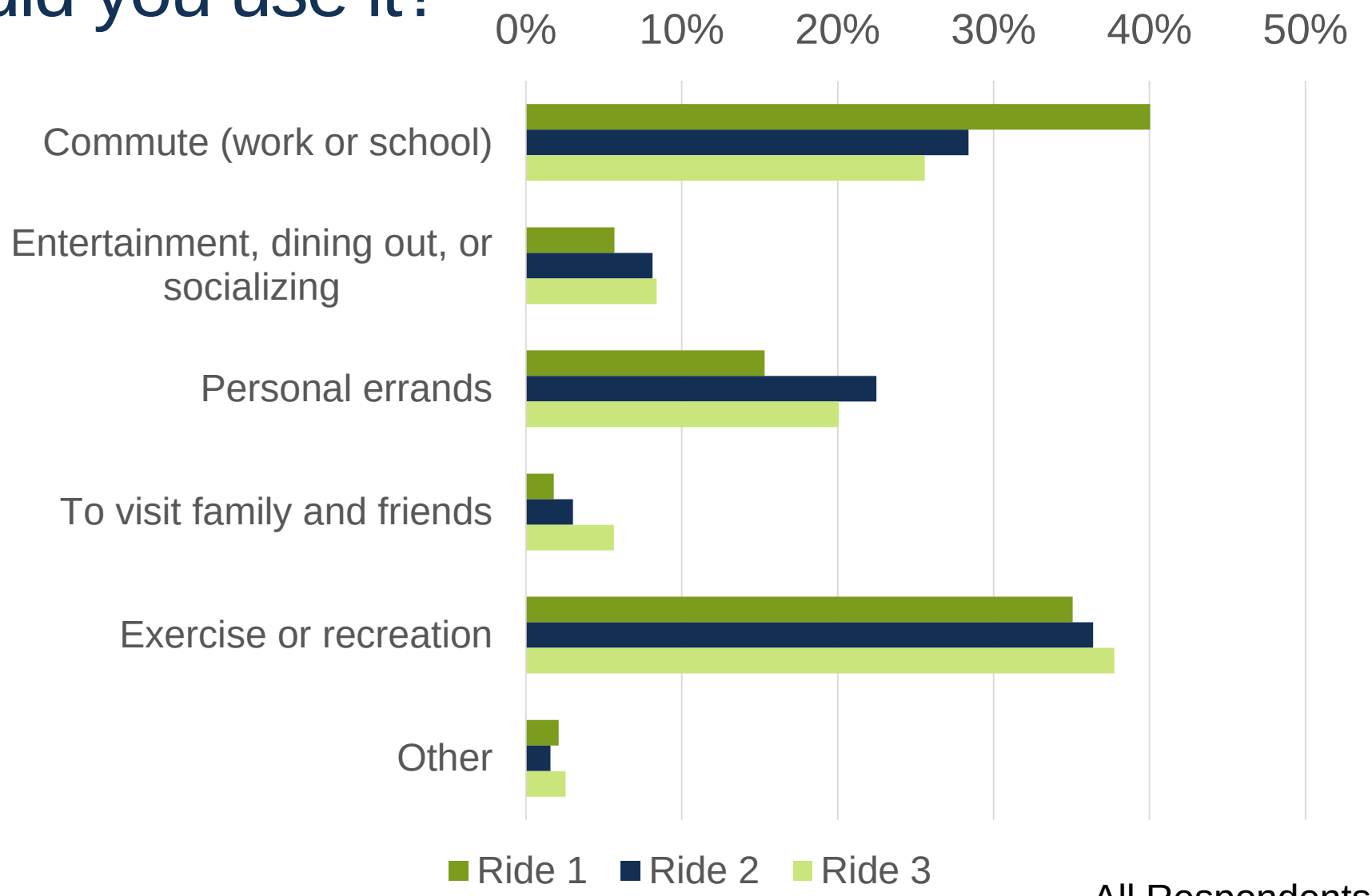


Bike Ridership Rates

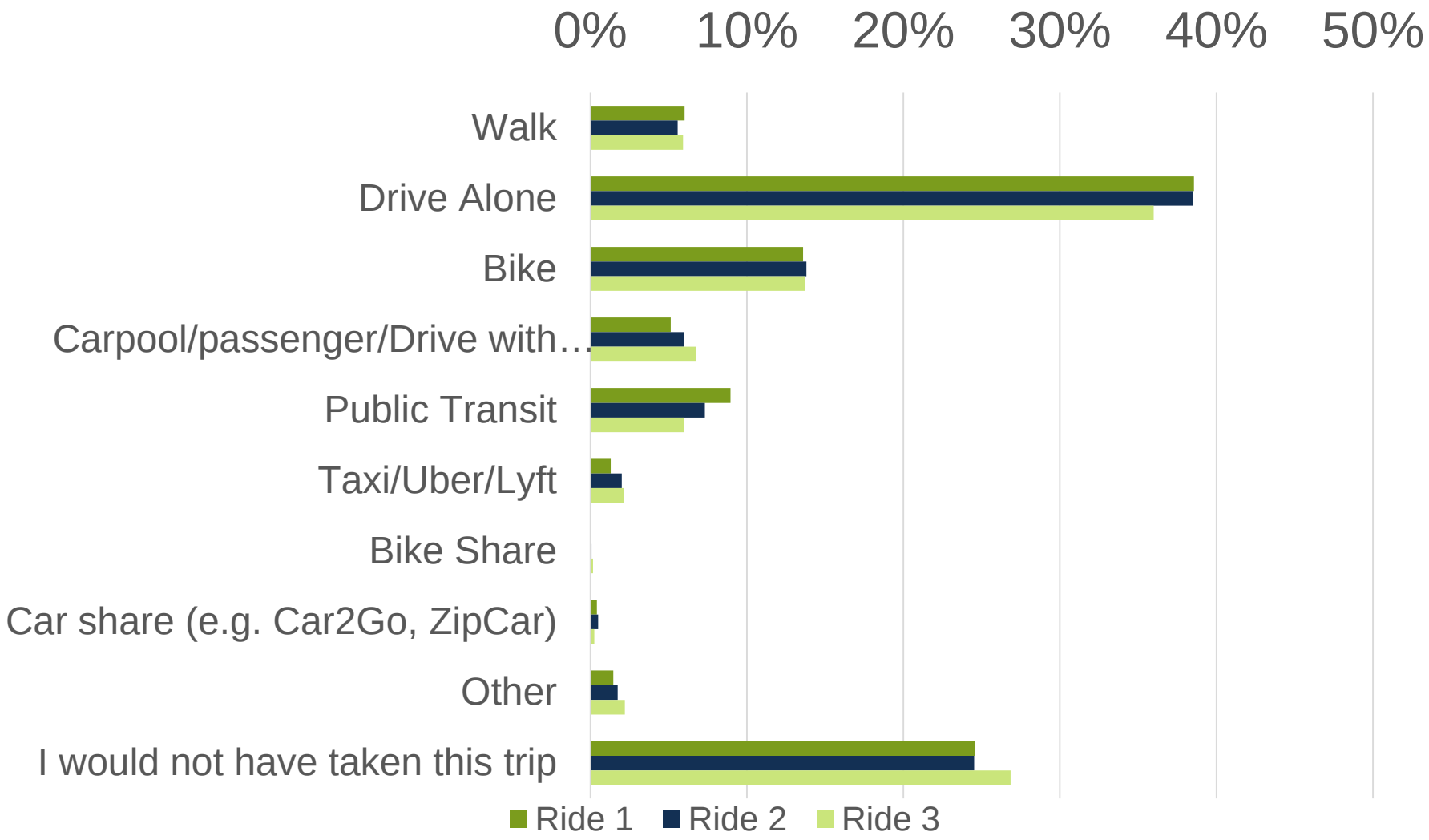


Last three times you used an e-bike…how did you use it?



All Respondents

Last three times you used an e-bike...how would have you gotten there instead



All Respondents

If They Didn't Have an E-bike: Trips Replaced by E-bike

	Percent of Trips by Mode that Would Have Been Used Instead of E-bike			
	Active Transportation and Transit*	**Automobile****	**Would not Have Taken this Trip**	**Other*****
Commute (Work or School)	40	46	1	36
Entertainment	8	9	4	6
Recreation or Exercise	29	9	89	39
Personal Errands	19	30	3	12
Visit Friends/Family	3	5	1	1
Other	1	1	2	6
Number of trips	*1063*	*1778*	*987*	*69*
Mileage/Trip	9	9	14	11
% Substituted VMT	24%	40%	34%	2%

* Includes walk, standard bicycle, and transit
** Includes Drive Alone, Carpool and Taxi
*** Includes Other or not specified

THE EBIKE POTENTIAL

Estimating the effect of e-bikes on person miles travelled and greenhouse gas emissions

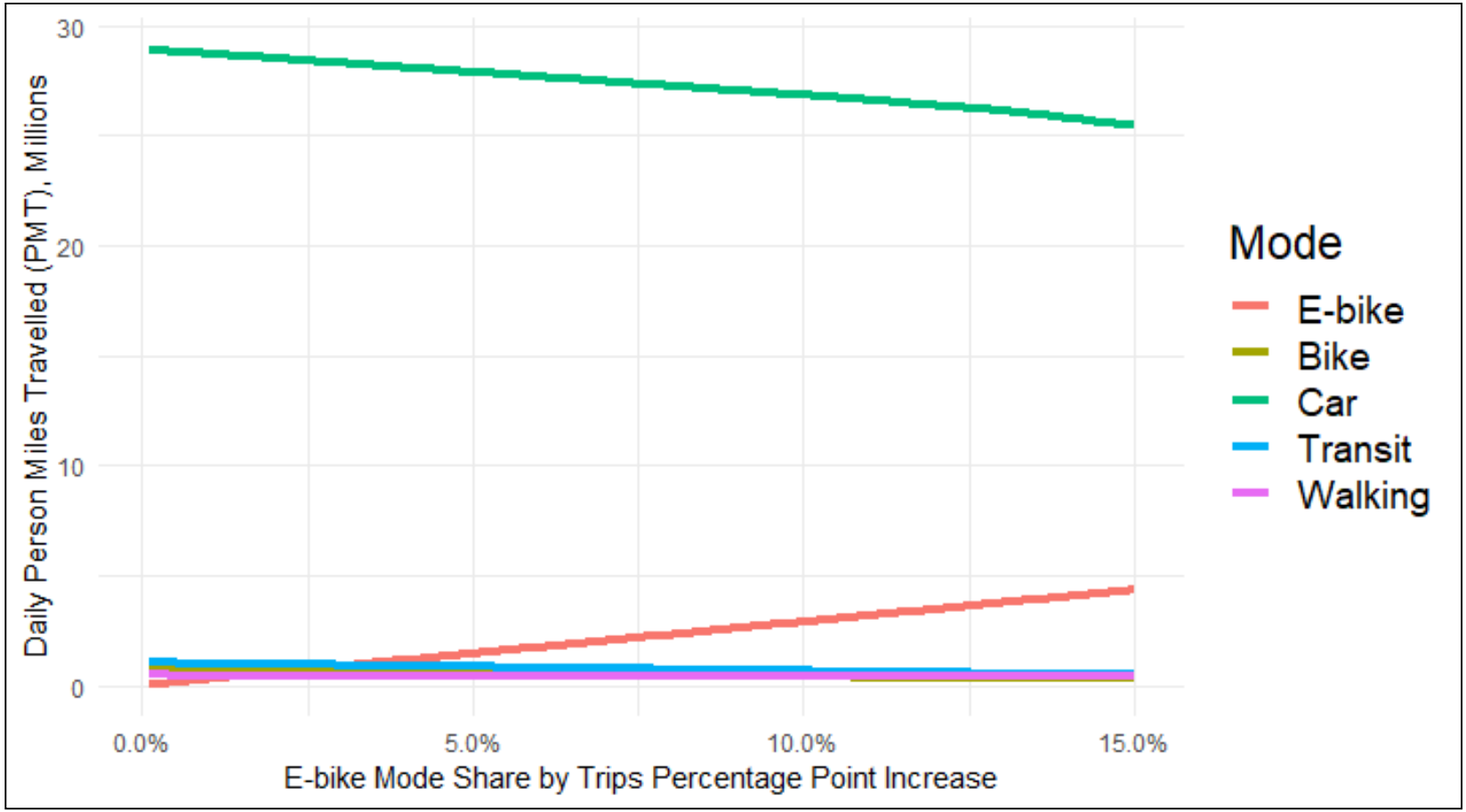
Portland Case Study – Model Inputs

input		Modal Split	avg. trip length	travelled miles (total)	trips (total)	Modal Split travelled miles
	car	84.700%	5.49	28,942,038	5,271,774	92.8%
	cycling	3.70%	3.23	743,837	230,290	2.4%
	public transit	4.200%	3.93	1,027,342	261,410	3.3%
	walking	7.400%	1	460,580	460,580	1.5%
	e-bike	0.000%	4.65	0	0	0
		100.0%		31,173,797	6,224,054	100.0%

Effect of e-bike promotion

	scenario 1	scenario 2	scenario 3
expected percentage pt increase of e-bike trip	5.0%	10.0%	15.0%
expected increase of e-bike trip length:	0.0%	0.0%	0.0%

Person miles traveled (PMT) per e-bike mode share by trip percentage point increase



Model Outputs

	Existing			
Emissions before per day:	8,080	tons CO_2/day		
per year:	2,949,056	tons CO_2/year		
	Scenario 1	**Scenario 2**	**Scenario 3**	
E-bike Mode Share:	5.00%	10.00%	15.00%	
Emissions after per day:	7,773	7,466	7,159	t CO_2/day
per year:	2,837,007	2,724,958	2,612,909	t CO_2/year
Reduction of CO_2 per day:	307	614	921	t CO_2/day
per year:	112,049	224,098	336,147	t CO_2/year
Percent reduction	**3.80%**	**7.60%**	**11.40%**	

Reports

- National Electric Bike Owner Survey
  - trec.pdx.edu/research/project/1041
- The E-Bike Potential: Estimating the effect of e-bikes on person miles travelled and greenhouse gas emissions (White Paper)
  - To be posted in April on trec.pdx.edu
- How E-Bike Incentive Programs are Used to Expand the Market (White Paper)
  - To be posted in April on trec.pdx.edu

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Join our E-bike Study

"Novel Approaches to Model Travel Behavior and Sustainability Impacts of E-Bike Use"

We looking for a cohort of current e-bike users to participate in the study for one year that would start this summer.

Requirement: must have a Bosch eBike motor system on bike

Email: macarthur@pdx.edu

http://bit.ly/NSFebikecohort

THE UNIVERSITY OF TENNESSEE KNOXVILLE

Portland State UNIVERSITY

BOSCH Bosch eBike Systems

NSF

Contact Information

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Portland State University
macarthur@pdx.edu

LEVER
Light Electric Vehicle Education + Research Initiative

LEVER is a consortium of academia, industry, government and non-government organizations aimed to address collective research needs of e-bikes and other LEVs. LEVER is lead by researchers at University of Tennessee and Portland State University

http://LEVresearch.com

NSF

NITC
NATIONAL INSTITUTE for TRANSPORTATION and COMMUNITIES

peopleforbikes.org

bpsa

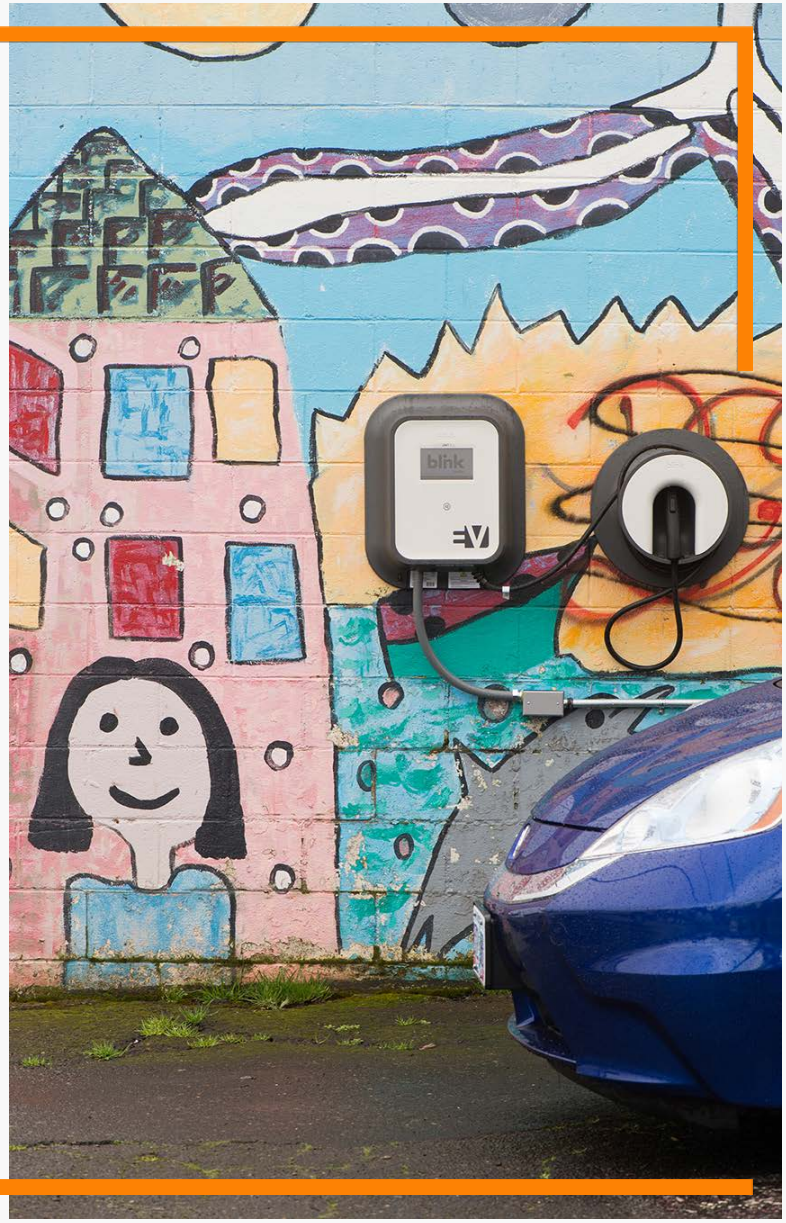
Transforming Active Transportation Through Electrification

The Community Electric Bike Program

Sergio Lopez, Program Manager

March 2019

FORTH



Who we are:

Nonprofit (501c6 & 501c3)

Mission: Forth is transforming the way we get around. Through innovation, demonstration projects, advocacy and engagement, we are advancing electric, smart, and shared transportation in the Pacific Northwest and beyond.

Funded by grants, member companies, and Roadmap—our annual conference

Membership 160+ companies, utilities, local governments, other stakeholders

Community Electric Vehicle Project

HONDA
The Power of Dreams

HACIENDA
COMMUNITY DEVELOPMENT CORP.

PACIFIC POWER
A DIVISION OF PACIFICORP

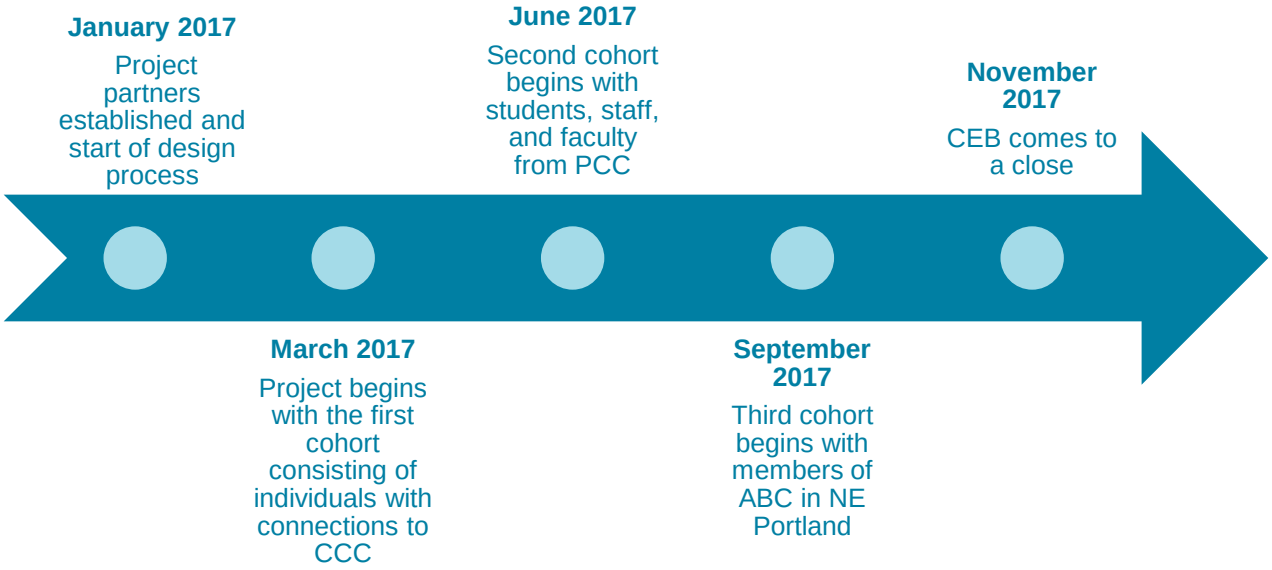
Community E-Bike Project

Community E-Bike Project

Community Cycling Center in NE Portland

- To test how E-bikes could benefit people in underserved communities
- How they can help diversify and improve transportation options for unlicensed individuals
- Measure 88 denies Oregon undocumented immigrants drivers licenses

Project Timeline



Project Design

Logistics

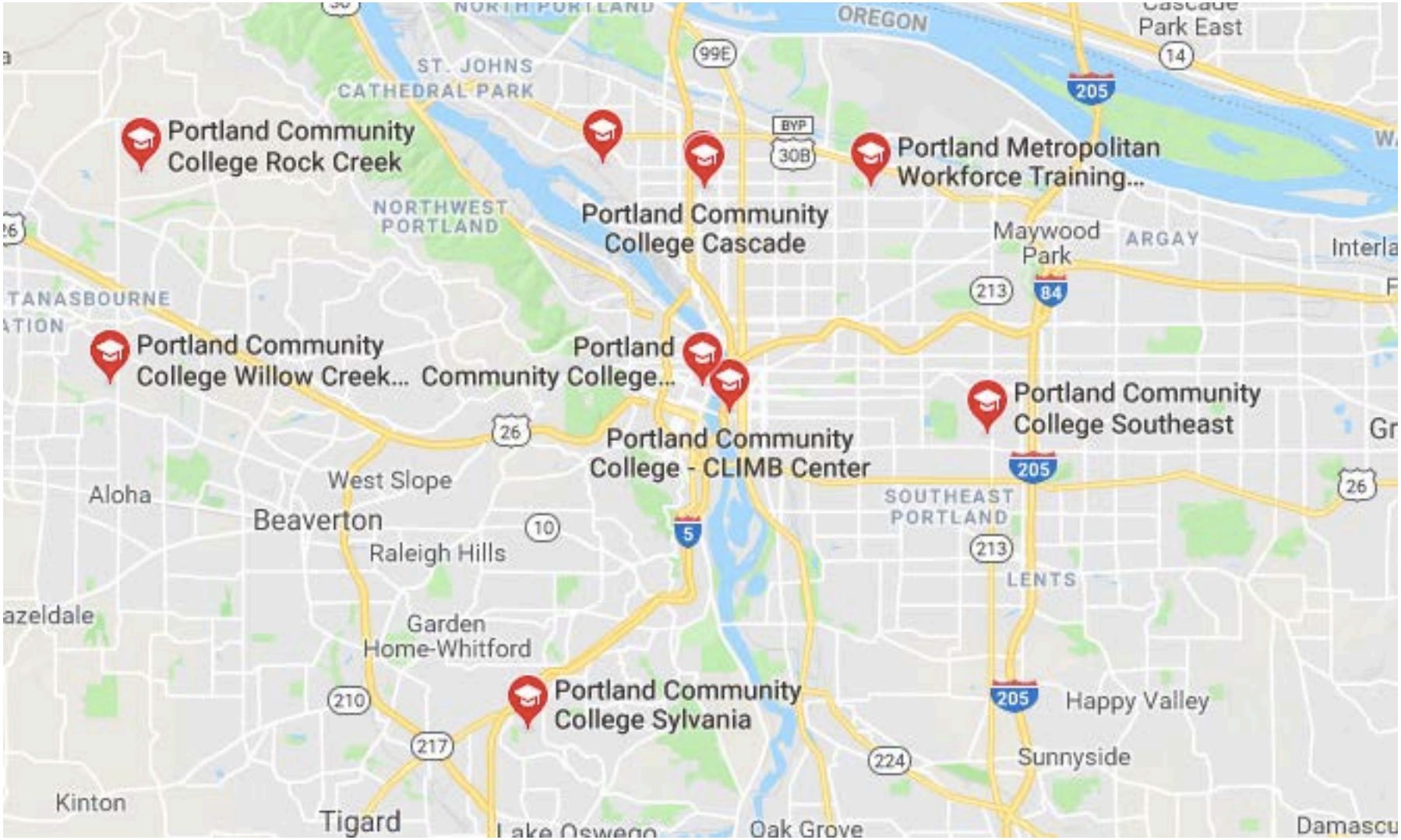
- **In partnership with GenZe, they were able to donate 10 used E-bikes for the project**
- **3 Cohorts of 10 participants were given the use of an E-bike, along with training orientation and safety equipment, for 10 weeks.**
  - **1st Cohort: Recruited participants**
  - **2nd Cohort PCC Students**
  - **3rd Cohort: ABC (Andando en Bicicletas en Cully)**
- **Throughout each of the cohorts, participants completed 3 surveys. These surveys helped gather information on use of the e-bikes and the overall experience of each participant.**

11TH HOUR PROJECT
THE SCHMIDT FAMILY FOUNDATION

COMMUNITY CYCLING CENTER

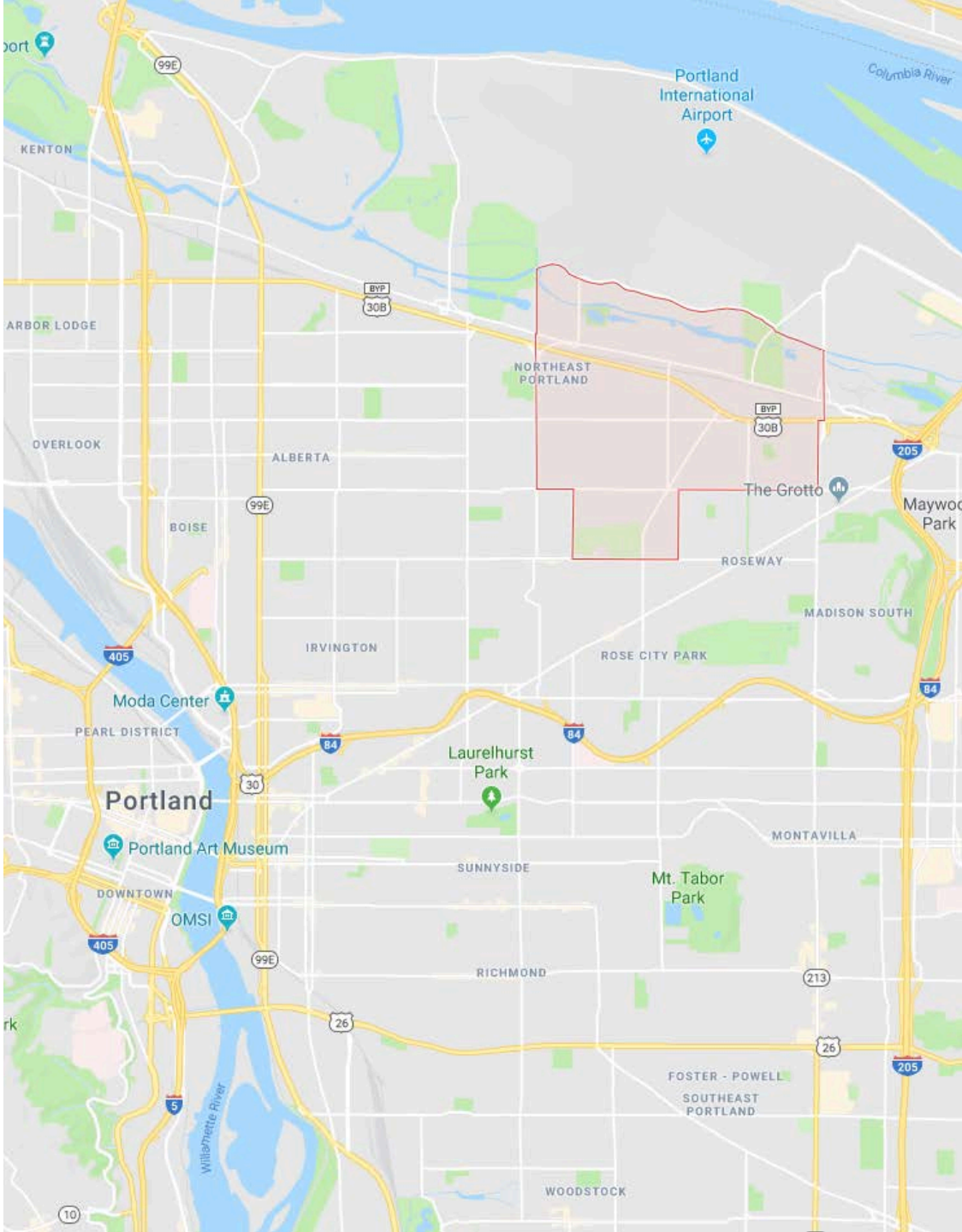
genZe

ANDANDO EN BICICLETAS EN CULLY
ABC


Portland Community College Rock Creek
Portland Community College Cascade
Portland Metropolitan Workforce Training...
Portland Community College Willow Creek...
Portland Community College...
Portland Community College - CLIMB Center
Portland Community College Southeast
Portland Community College Sylvania
NORTH PORTLAND
ST. JOHNS CATHEDRAL PARK
NORTHWEST PORTLAND
OREGON
Park East
Maywood Park
ARGAY
TANASBOURNE
Aloha
Beaverton
West Slope
Raleigh Hills
Garden Home-Whitford
SOUTHEAST PORTLAND
LENTS
Happy Valley
Sunnyside
Kinton
Tigard
Lake Oswego
Oak Grove
99E
BYP
30B
205
14
213
84
26
10
5
210
217
224

Cully

- Most diverse census tract in Oregon
- 43% of residents are renters
- 85% of Cully students qualify for free or reduced lunch
- Limited transit and transportation options
- Adjacent to rail lines, industrial yards, and the airport

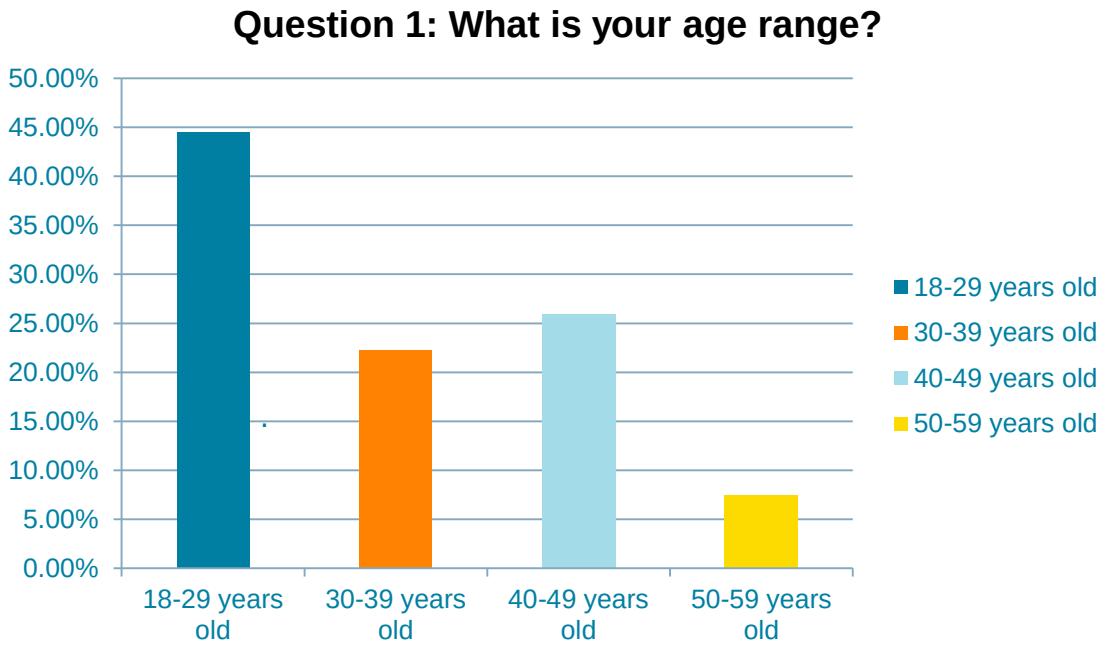


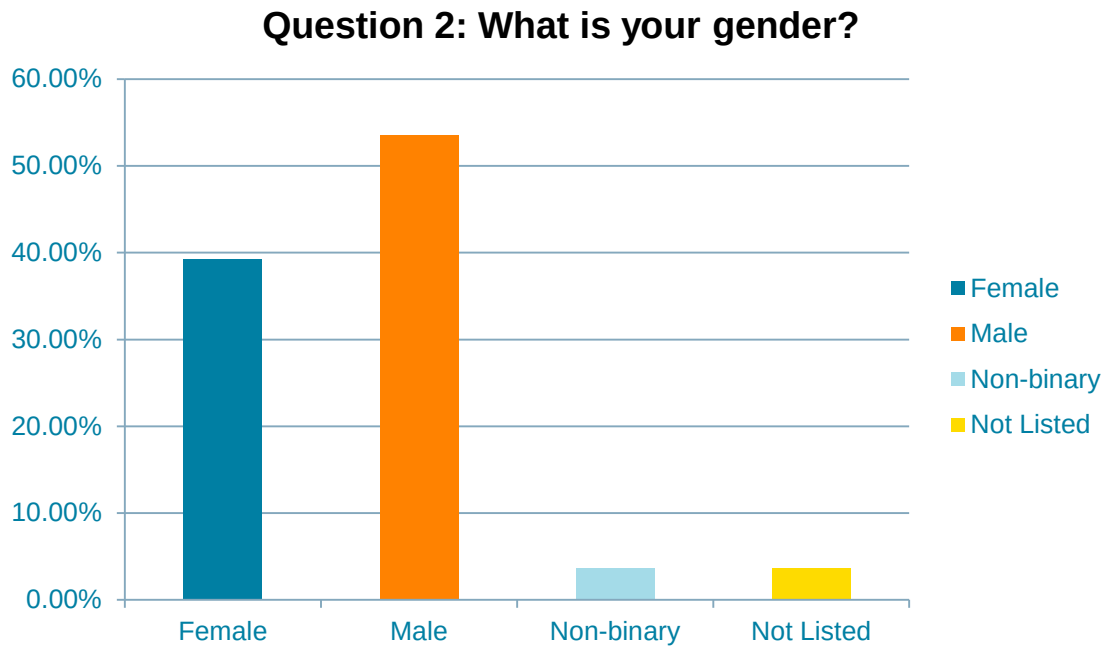
3rd Cohort: ABC

- A group of Hacienda Residents that organize events and programs to promote bicycling. This group of organizers call themselves Andando en Bicicletas en Cully (ABC), which translates to “Riding Bikes in Cully.” The Major focus of ABC’s work is to create community by hosting bike rides, advocating for bicycle storage and safe routes to school, and providing basic bicycle maintenance and training to friends and neighbors.

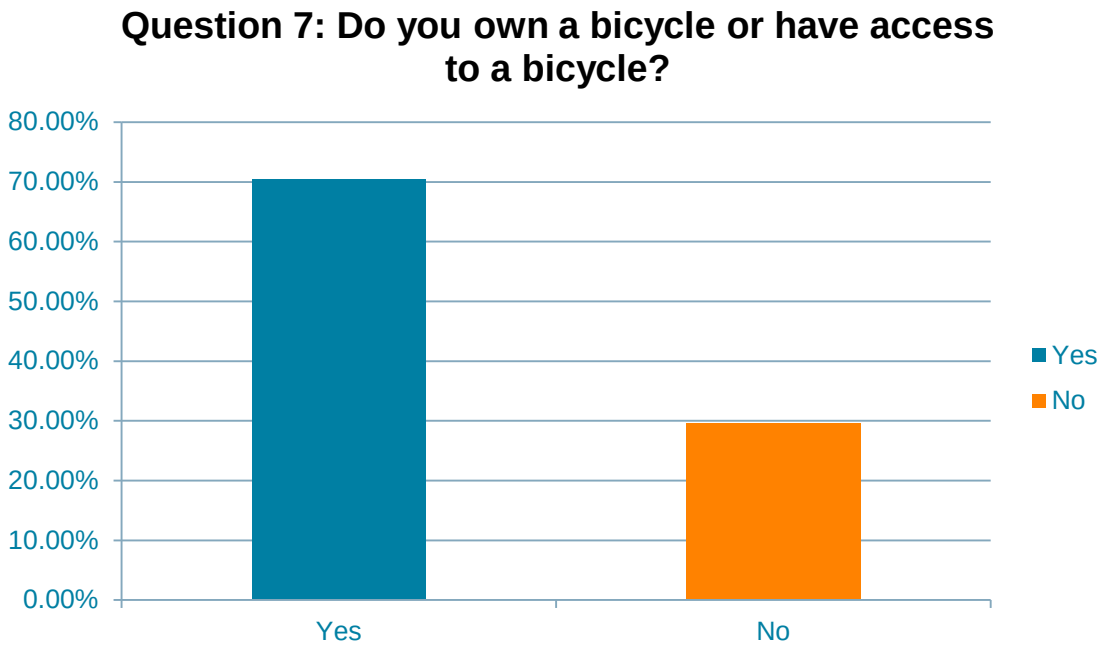
Outcomes

- All survey information was submitted anonymously
- 28 participants
- Demographics
- Transportation usage
- An estimate of 3,997 miles traveled

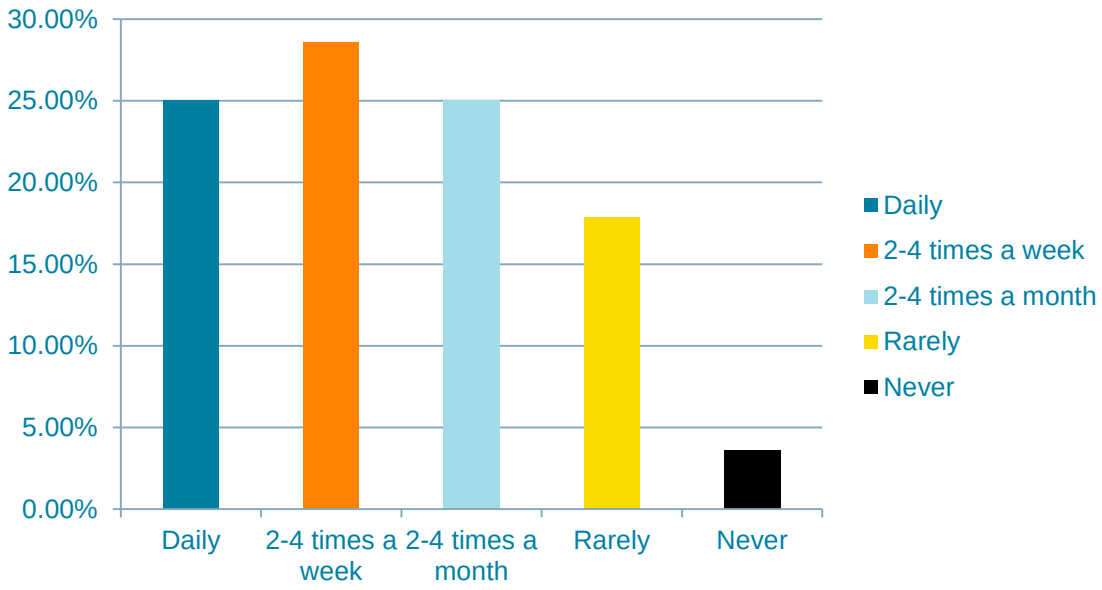



Question 2: What is your gender?
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Female
Male
Non-binary
Not Listed
Female
Male
Non-binary
Not Listed

Question 11: What modes of transportation do you regularly use? Please check all that apply.	
Bike	16
Transit	17
Carpool	4
Car	6
Walk	17



Question 8: How often do you ride a bicycle?



Barriers

Durability:

- Materials could have been sturdier
- Better tires
- Fender got loose after riding through a shallow pothole

Weather:

- 1st and 3rd cohort overlapped with rainy season
- Not avid bike riders; relied on bus when it rained
- Not equipped with rain gear

Participants Stated:

Pros:

Faster commute times
Easier to ride
Cost effective
Eco-friendly
bikes

Cons:

Too heavy
Too flashy
Charging the battery
Not as healthy as traditional

What's next?

What are the best ways to introduce new transportation technology into diverse communities?

- Pilot Projects in underserved communities
- Education and outreach
- Serves as proper ethnography for new tools

- “ The approach to changing street culture takes a step back from designing new street systems and focuses instead on the *human infrastructure* that shapes our current mobility”

»-Adonia E. Lugo, Bicycle/Race –Transportation, Culture, & Resistance

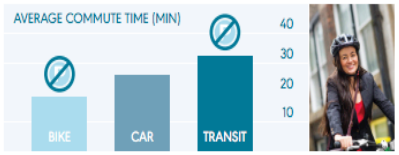
ELECTRIC BIKES
Power your commute

FORTH
Empowering Mobility

E-bikes offer all the advantages of a regular bicycle – without the sweat or spandex. That's why more Oregonians are making the switch to electric bicycles every day. To find out how to test-ride an e-bike and transform your commute, visit forthmobility.org/ebikes.

Fast-track commuting.

Leave bumper-to-bumper traffic and bus schedules behind.



It pays to ride.

Ditch the gas, parking fees and auto repair bills.

$35 PER MONTH all expenses including electricity

$884 PER MONTH fuel, parking, insurance, maintenance

Hassle-free parking.

Free bike rack parking means you can save your meter money for something fun.

P

P $185 PARKING FEES PER MONTH

Workout optional.

With variable motor settings, push yourself or enjoy the cruise: it's up to you.

Enjoy the outside.

Breathe easy with a no-pollute commute.

CO_2 EMISSIONS	DAILY	ANNUALLY
E-BIKE	0.002 LBS	0.5 LBS
CAR	12 LBS	2936 LBS

No sweat.

Show up looking sharp.

forthmobility.org/ebikes

Thank you!

Sergiol@forthmobility.org

FORTH

Questions and discussion